Remarks

Claim Rejections - 35 USC 112(1)

Claims 1-44 stand rejected under 35 USC 112(1) because "it is difficult to understand how the shape of the optical element can determine the pattern of radiation from the light source."

Respectfully, we do not maintain that "the shape of the optical element can determine the pattern of the radiation from the light source." Such is not said in the text recited from claim 1. Illumination of the optical element will take a form with some symmetry, e.g. the slit-like rectangular shown in Fig. 1.

An optical element has a shape with a symmetry. Commonly, a lens is rotationally symmetric.

The illuminating radiation is partly absorbed, creating a heat source of a symmetry similar to the illumination symmetry. Then the cited criterion of claim 1 is easily evaluated by the specialist. See description of Figs. 1, 2 and mainly of Figs. 5a, 5b in paragraphs [0039] to [0043].

Claim Rejections - 35 USC 112(2)

Claim 26 is amended to delete the word "type".

Claims 1-44 stand rejected under 35 USC 112(2) because "it is unclear how the symmetry characteristic of the heat supply can be different from the symmetry of the optical element."

For § 112(2) practically the same explanation as for 112(1): E.g. in Fig. 1 the heat supply - caused by the slit-shaped cross section 10 of illumination - is different in symmetry from circular lens 1 (see paragraph [0025]).

Correctly, the Figs. show an axis of symmetry of the optical element, but not "with the heat supply."

The heat supply in Fig. 1 e.g. is rectangular. In Fig. 2 the heat supply is two spaced circles, having some symmetry but other than the optical element.

Claim Rejections - 35 USC 102

Claims 1-16, 21-24 and 36-44 stand rejected as being anticipated by the patent to McCrary.

Valid rejection under 35 USC 102 requires that each feature of a rejected claim be disclosed in a single reference. "For anticipation under 35 USC 102, the reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present." MPEP 706.02(a)

McCrary does not disclose each feature of the rejected claims.

The present invention relates to the art of cooling a lens under heat load (light absorption) such that the lens does not (or minimally) change its optical properties.

McCrary relates the art of compensating an optical system (of at least 2 elements) for the optical changes of an element caused by its temperature change. See e.g. McCrary Abstract, 1st sentence.

No hint is given in McCrary to illumination being a source of heat load. See column 1, lines 13-25 of McCrary where only ambient temperature is addressed.

Consequently, McCrary does not disclose a "heat supply...that lacks symmetry corresponding to the shape of said optical element" as recited in claim 1 of the present invention. (see column 2, lines 13, 14 of McCrary "thermal contraction or expansion of a member along its radial plane."

Note McCrary additionally does not disclose a mount having a symmetry characteristic that does not correspond to the shape of the optical element, as recited in Applicant's claim 1.

See McCrary column 3, lines 62-65 "a bore is formed for holding the lenses": both are circular.

The cited portion in column 6, lines 32-47 of McCrary has no relation to the invention. Note that "selective control of the angle interface" relates to McCrary's distance setting means between two optical elements. The laser beam source is said to be dependent on ambient temperature. Influence of laser light on thermal effects in optical elements is not stated.

Claim Rejections - 35 USC 103

Claims 17-20 and 25-35 stand rejected as being unpatentable over McCrary and further in view of the patent to Ohsaki.

Valid rejection under 35 USC 103(a) requires evidence of a suggestion or motivation for one skilled in the art to combine prior art references to produce the claimed invention. US Court of Appeals for the Federal Circuit (*Ecolochem inc. v Southern California Edison Co., Fed. Cir.*, No. 99/1043, 9/7/00).

The best defense against hindsight-based obviousness analysis is the rigorous application of the requirement for showing a teaching or motivation to combine the prior art references, according to the court.

McCrary and Ohsaki do not motivate or suggest to one skilled in the art to combine these references to produce Applicant's claimed invention.

Recently, in In Re Sang-Su Lee (00-1158) the Court of Appeals for the Federal Circuit confirmed the holding in the above decision. The court analyzed 35 USC 103 requirements starting from the Administrative Procedure Act and held (citations omitted):

"Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies.

"The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decision making." Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational.

"As applied to the determination of patentability vel non when the issue is obviousness, it is fundamental that rejections under 35 USC §103 must be based on evidence comprehended by the language of that section. (Emphasis added). When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. (Emphasis added)

"The factual inquiry whether to combine references must be thorough and searching. It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. There must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the Applicant. Teachings of references can be combined only if there is some suggestion or incentive to do so.

As stated above, **McCrary and Ohsaki do not motivate or suggest to a person skilled in the art to combine these references to duplicate the claims of the present invention.**

Ohsaki does not add information to paragraphs [0003] and [0004] of the present specification.

Ohsaki is not a "scanner" but a "stepper" (Column 1, line 22). The present invention deals with details within projection lens PL (Figs. 1, 2) for which Ohsaki discloses no details at all.

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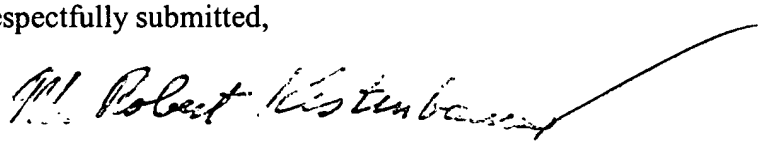
Wherefore, further consideration and allowance of the claims in this application is respectfully requested.

Respectfully submitted,



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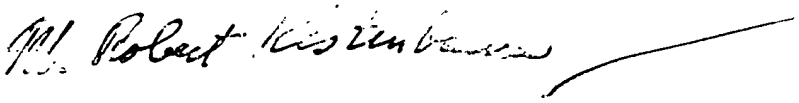

M. Robert Kestenbaum

**"Version with Markings to show Changes Made"**

We claim:

1. An optical arrangement, comprising:

a light source that emits radiation,

a mount,

an optical element fastened in said mount,

wherein said optical element is acted on by said radiation such that a heat supply results from said radiation that lacks symmetry corresponding to the shape of said optical element, and

a connecting structure between said optical element and said mount, having a symmetry characteristic that does not correspond to the shape of the optical element.

2. An optical arrangement, comprising:

a light source that emits radiation,

a mount,

an optical element fastened in said mount,

wherein said optical element is acted on by said radiation such that heat that results from said radiation lacks symmetry corresponding to the shape of said optical element, and

a single- or multi-part thermally conducting element arranged in operative connection with said optical element and said mount and having a form of heat transport that effects an at least partial compensation of the asymmetry of temperature distribution in said optical element.

3. A projection exposure system for microlithography, comprising:

an optical element that is heated by radiation in a manner that lacks rotational symmetry, and

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a cooling system for said optical element that lacks rotational symmetry, said cooling system including passive thermally conducting devices that effect cooling.

4. A projection exposure system for microlithography, comprising

an optical element that is heated by radiation in a manner that lacks rotational symmetry, and

at least one passively thermally conducting part arranged in thermal contact with said optical element, which part covers a portion of the cross section of said optical element which is not exposed to said radiation, and which part reduces temperature gradients in said optical element.

5. The optical arrangement according to claim 1, in which said optical element comprises a transmitting element.

6. The optical arrangement according to claim 5, in which said transmitting element comprises a lens.

7. The optical arrangement according to claim 2, in which said optical element comprises a transmitting element.

8. The optical arrangement according to claim 7, in which said transmitting element comprises a lens.

9. The projection exposure system according to claim 3, in which said optical element comprises a transmitting element.

10. The projection exposure system according to claim 9, in which said transmitting element comprises a lens.

11. The projection exposure system according to claim 4, in which said optical element

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comprises a transmitting element.

12. The projection exposure system according to claim 11, in which said transmitting element comprises a lens.

13. The optical arrangement according to claim 1, in which said optical element comprises a mirror.

14. The optical arrangement according to claim 2, in which said optical element comprises a mirror.

15. The projection exposure system according to claim 3, in which said optical element comprises a mirror.

16. The projection exposure system according to claim 4, in which said optical element comprises a mirror.

17. The optical arrangement according to claim 1, having a slit-shaped image field.

18. The optical arrangement according to claim 2, having a slit-shaped image field.

19. The projection exposure system according to claim 3, having a slit-shaped image field.

20. The projection exposure system according to claim 4, having a slit-shaped image field.

21. The optical arrangement according to claim 5, in which said optical element is arranged near a field plane.

22. The optical arrangement according to claim 7, in which said optical element is arranged near a field plane.

23. The projection exposure system according to claim 9, in which said optical element is arranged near a field plane.

24. The projection exposure system according to claim 11, in which said optical element is

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arranged near a field plane.

25. The optical arrangement according to claim 1, further comprising a reticle, the illumination of which lacks rotational symmetry.

26. The optical arrangement according to claim 25, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination [type].

27. The optical arrangement according to claim 2, further comprising a reticle, the illumination of which lacks rotational symmetry.

28. The optical arrangement according to claim 27, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination type.

29. The projection exposure system according claim 3, further comprising a reticle, the illumination of which lacks rotational symmetry.

30. The projection exposure system according to claim 29, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination type.

31. The projection exposure system according to claim 29, in which said optical element is arranged near a pupil plane.

32. The projection exposure system according to claim 4, further comprising a reticle, the illumination of which lacks rotational symmetry.

33. The projection exposure system according to claim 32, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination type.

34. The projection exposure system according to claim 32, in which said optical element is arranged near a pupil plane.

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35. The optical arrangement according to claim 1, in which said connecting structure comprises portions of different materials.

36. An optical arrangement comprising:

a light source that emits radiation,

a mount,

an optical element fastened to said mount,

wherein said optical element is acted on by said radiation such that heat that results from said radiation lacks symmetry corresponding to the shape of said optical element, and

a single- or multi-part passive thermally conducting element arranged in operative connection with said optical element and said mount and having a form of heat transport that effects an at least partial compensation of the asymmetry of temperature distribution in said optical element,

wherein said passive thermally conducting element comprises an assembly of portions of different material.

37. A projection exposure system for microlithography, comprising:

an optical element that is heated by radiation in a manner that lacks rotational symmetry, and

a cooling system for said optical element that lacks rotational symmetry, said cooling system including passive thermally conducting devices that effect cooling,

wherein said passive thermally conducting devices comprise portions of different material.

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38. The projection exposure system according to claim 4, in which said at least one part of a thermal conductor in thermal contact with said optical element comprises a plurality of different materials.

39. The optical arrangement according to claim 1, in which said connecting structure comprises adjustable portions.

40. The optical arrangement according to claim 2, in which said thermally conducting element is adjustable.

41. The projection exposure system according to claim 3, in which said thermally conducting elements comprise adjustable portions.

42. The projection exposure system according to claim 4, in which said at least one part of a thermal conductor in thermal contact with said optical element is at least partially adjustable.

43. An optical arrangement, comprising:

a light source,

at least one optical element, and

a passive compensator of thermal effects caused by radiation from said light source, which compensator lacks rotational symmetry.

44. A projection exposure system for microlithography, comprising:

an optical element that is heated by radiation in a manner that lacks rotational symmetry, and

a cooling system that lacks rotational symmetry for said optical element, said cooling system comprising passive thermally conducting devices.

Ohsaki does not add information to paragraphs [0003] and [0004] of the present specification.

Ohsaki is not a "scanner" but a "stepper" (Column 1, line 22). The present invention deals with details within projection lens PL (Figs. 1, 2) for which Ohsaki discloses no details at all.

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